

[0001] LIGHTED BALLOON ENTERTAINMENT DEVICE

[0002] CROSS REFERENCE TO RELATED APPLICATION

[0003] This application claims the benefit of U.S. provisional application no. 60/455,683, filed March 17, 2003 which is incorporated by reference as if fully set forth.

[0004] BACKGROUND

[0005] Balloons are simple and traditional entertainment items for young children. However, inflating a balloon, especially orally, is not a simple task because air has a tendency to escape though the mouth of the balloon between bursts of inflation air or after inflation and prior to sealing the mouth. Therefore, it would be desirable to provide a device which eases balloon inflation.

[0006] Since balloons are typically novelty items, any features which provide added distinction are desirable. Providing lights within an otherwise plain balloon would be effective to add interest to the balloon. It would be desirable to provide an efficient, cost effective device for adding light to a balloon.

[0007]

## SUMMARY

[0008] Briefly stated the invention provides a balloon inflation and air containment device. The device includes a first tube with a first end for receiving an air supply and a second end for receiving a mouth of a balloon. A collapsible second tube is connected to the first tube in a substantially airtight manner and extends away from the first tube. In one embodiment, a lighting device may be positioned inside the balloon.

Also provided is a method for constructing a balloon assembly. The method includes providing a tube assembly including a first tube and a collapsible second tube, axially connected to the first tube, which extends away from the first tube. A balloon is provided, and the tube assembly is axially inserted into a mouth of the balloon with the second tube leading into the balloon. The method includes providing an air supply at a first end of the first tube and inflating the balloon with the air supply. In one embodiment, a lighting device having an extension rod and a lighting element connected to the extension rod is provided. The lighting device is inserted through the tube assembly into an interior of the balloon.

[0009]

## BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The foregoing summary as well as the following detailed description of the preferred embodiment of the present invention will be better understood when read in conjunction with the appended drawings. For the purpose of illustrating the invention, there is shown in the drawings an embodiment that is currently preferred. It should be understood, however, that the invention is not limited to the precise arrangement shown.

[0011] Figure 1a is a top perspective view of an air filling pipe of an air filling device in accordance with a preferred embodiment of the invention.

[0012] Figure 1b is an elevational view of the air filling pipe of Figure 1.

[0013] Figure 1c is a cross-sectional view of the air filling pipe of Figure 1 taken along line 1c-1c of Figure 1b.

- [0014] Figure 1d is a top plan view of the air filling pipe of Figure 1.
- [0015] Figure 1e is a bottom plan view of the air filling pipe of Figure 1.
- [0016] Figure 2a is a top perspective view of a tube assembly of the air filling device in accordance with a preferred embodiment of the invention.
- [0017] Figure 2b is a top perspective view of the tube assembly of Figure 2a illustrating an assembly procedure.
- [0018] Figure 3a is a top perspective view of a balloon supporter of the device in accordance with a preferred embodiment of the invention.
- [0019] Figure 3b is a top plan view of the balloon supporter of Figure 3a.
- [0020] Figure 3c is a cross-sectional view of the balloon supporter taken along lines 3c-3c of Figure 3b.
- [0021] Figure 4 is a perspective view illustrating a method of inserting the air filling pipe into a balloon in accordance with a preferred embodiment of the invention.
- [0022] Figure 5 is a perspective view illustrating a method of manually fitting the balloon onto the air filling pipe according to a preferred embodiment of the invention.
- [0023] Figure 6 is a perspective view illustrating a method of press fitting the balloon supporter onto the filling pipe according to a preferred embodiment of the invention.
- [0024] Figure 7 is a cross-sectional view of a balloon assembly after installation of the air filling device according to a preferred embodiment of the invention.
- [0025] Figure 8 is a perspective view illustrating one method of inflating a balloon using the air filling device.
- [0026] Figure 9a is a cross-sectional view of a partially-inflated balloon assembly during inflation using the air filling device.
- [0027] Figure 9b is a cross-sectional view of a partially-inflated balloon assembly during an interruption of inflation.

[0028] Figure 10 is a perspective view illustrating a method of inserting a lighting device into an inflated balloon according to a preferred embodiment of the present invention.

[0029] Figure 11 is a partial cross-sectional view illustrating a condition of the air filling device immediately after a lighting device has been inserted into the balloon.

[0030] Figure 12a is a cross-sectional view of an air filling pipe illustrating air seals in accordance with a preferred embodiment of the invention.

[0031] Figure 12b is an enlarged, fragmentary, cross-sectional view of Figure 12a showing the air seals in greater detail.

[0032] Figure 13a illustrates an embodiment of the invention in which a rod extends through the center of a sealing plug.

[0033] Figure 13b illustrates an embodiment of the invention in which a plug is connected on end to a supporting rod, and on another end to a lighting device.

[0034] Figure 13c illustrates an embodiment of the invention in which a balloon assembly is mounted using a plug that is connected on end to an outer surface of a filling pipe, and on another end to a supporting rod.

[0035] DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT(S)

[0036] Certain terminology is used in the following description for convenience only and is not considered limiting. Words such as "front", "back", "top" and "bottom" designate directions in the drawings to which reference is made. This terminology includes the words specifically noted above, derivatives thereof and words of similar import. Additionally, the terms "a" and "one" are defined as including one or more of the referenced item unless specifically noted.

[0037] The preferred embodiments of the present invention will be described with reference to the drawing figures where like numerals represent like elements throughout.

[0038] Referring now to Figures 1a - 1e, an air filling pipe 10 of a balloon inflation and air containment device 70 according to a preferred embodiment of the present invention is shown. The air filling pipe 10 comprises a first tube with a hollow, tube-like object with a circular cross-section having a step 36 on its outer surface to provide a seat for a balloon supporter 12, as shown in Figure 7. Alternatively, the pipe 10 may have an elliptical cross-section or even a polygonal cross-section. Preferably, the pipe 10 is formed of a polymeric material; however, any suitable material may be used including metal or wood.

[0039] Referring to Figures 2a and 2b, a sealing film tube 11 is connected to the air filling pipe 10 to form a tube assembly 50. The sealing film tube 11 comprises a second tube formed of a collapsible plastic thin-wall material. The sealing film tube 11 is also preferably constructed of a polymeric material, and may be molded or woven. However, any suitable collapsible material and fabrication method may be used. A longer sealing film tube 11 may provide better air sealing. However, if the sealing film tube 11 is too long, inserting the tube 11 into a balloon 20, as shown in Figure 4, will become difficult.

[0040] Figure 2b shows how the sealing film tube 11 is mounted on the air filling pipe 10. The tube 11 is first slid onto a smaller-diameter end of the air filling pipe 10. Then, an adhesive tape 13 is wrapped around the surface of the pipe 10 with half of the tape applied to an outer surface of the pipe 10 and the other half applied to an edge of the tube 11. Any suitable adhesive tape may be used. The tape provides a very strong mounting joint between the tube 11 and the pipe 10. In order to achieve a better sealing joint, the length of the adhesive tape 13 should be greater than the circumference of the film tube 11 so that one end of the tape 13 overlaps with another end. This will ensure no air leakage. However, if the sealing film tube 11 fits the air filling pipe 10 very tightly, a shorter tape 13 can be used without affecting the seal because the connection between the film tube 11 and the filling pipe 10 will be tight enough to stop any leakage.

[0041] Referring to Figures 3a-3c, 9a and 11, the balloon supporter 12 provides a seat for the inflated balloon 20. Preferably, the balloon supporter 12 is constructed as a molded polymeric material, but may be formed in any suitable manner of any material. The balloon supporter 12 will prevent the balloon 20 from excessive swaying while the assembly is in motion.

[0042] On the bottom part of the supporter 12, there is an aperture which is placed over the air filling pipe 10 with the balloon skin disposed between, as seen in Figs. 9a and 9b. Preferably, the aperture is sized to mate securely with the filling pipe 10 and prevent leakage of air from the balloon. Once the balloon is inflated, the lower part of the balloon surface pushes downwardly on the balloon supporter 12 and makes the supporter sit more securely on the pipe 10.

[0043] Installation of the tube assembly 50 into the balloon is as follows. Referring to Figure 4, the balloon 20 is first inserted through the circular aperture of the supporter 12. The tube assembly 50 is subsequently inserted into the balloon 20. A correct size balloon should preferably have a mouth diameter slightly smaller than the outside diameter of the air filling pipe 10. A small rubbing force by fingers pushes the balloon skin towards an opposite end of the pipe 10 as shown in Figure 5. After the air filling pipe 10 has been inserted to a predetermined depth, the balloon supporter 12 is then slid onto the seat of the pipe 10, forming a part of the device 70, as seen in Figure 6. Therefore, the device 70, when completely assembled, includes the tube assembly 50 and the supporter 12. Friction between the balloon skin and the perimeter of the aperture of the balloon supporter 12 holds the supporter 12 in place before inflating the balloon 20. Figure 7 shows the cross-section layout of a complete, assembled balloon assembly 80 which includes the inflation and air containment device 70 and the balloon 20. The next step is to blow air into the balloon.

[0044] The sealing film tube 11 on the air filling pipe 10 acts as a uni-directional valve which allows air to enter the balloon 20 during inflation, but prevents air from being expelled from the balloon when inflation is stopped. Figure

8 shows a method of inflating the balloon using a foot pump 40 and tube 41. Alternatively, the balloon may be inflated using any method including orally blowing into the filling pipe 10, or using other air filling apparatuses.

[0045] Figures 9a and 9b show how the sealing film tube 11 works as a uni-directional valve. When the air pressure P1 on the mouth of the air filling pipe 10 is higher than the air pressure P2 inside the balloon 20, air will flow into the balloon by passing through the center of the filling pipe 10 and the center of the sealing film tube 11. As air pressure inside the balloon 20 increases, the balloon 20 expands. When the air pressure P1 returns to atmospheric pressure for any reason, the pressurized air inside the balloon 20 tends to escape to the outside environment through the center hole of both the sealing film tube 11 and the air filling pipe 10. As seen in Figure 9b, however, pressurized air will simultaneously compress the sealing film tube 11 until the thin walls of the sealing film tube 11 contact one another. The collapsed film tube 11 prevents any further air from flowing outwardly through the sealing film tube 11. Therefore, the inflation process can be stopped anytime, and the process can be resumed anytime. When inflation is stopped and pressure P1 returns to atmospheric pressure, a small amount of air inside the balloon escapes through the pipe 10. However, the escape rate is not fast enough to allow a significant size reduction in the balloon. When inflation resumes and the pressure P1 becomes greater than P2, air will flow into the balloon once again.

[0046] After the balloon has been inflated to a predetermined size, a lighting device 30 may be added to the device 70. The lighting device 30 is preferably inserted into the balloon through the tube assembly 50 to provide lighting to the balloon assembly 80. Also, if desired, the lighting device 30 may be inserted prior to inflation. The lighting device 30 includes an extension rod 38 and a lighting element 31. Referring to Figure 10, the lighting device 30 is first inserted through the air filling pipe 10. As the lighting device 30 passes through the sealing film tube 11, a small amount of air leaks out of the balloon due to gaps between the

sealing film tube 11 and the lighting device 30. Referring now to Figures 11, 12a and 12b, the air leakage will stop as soon as a plug 14 is inserted into the air filling pipe 10. The plug 14 contacts and is slightly deformed by or deforms seals 101 and 102 located on the inner wall of the air filling pipe 10, thereby sealing the pipe. Usually, one of the seals is sufficient to keep air inside the balloon. However, the two seals 101 and 102 provide a more secure double sealing joint. The plug 14 additionally seals against a surface of the extension rod 38, as shown. Alternatively, the plug 14 may be formed integral with the extension rod 38. Once assembled, the lighted balloon assembly 80 may be carried or mounted by an end of the extension rod 38.

[0047] The lighting device 30 inside the balloon transforms a traditional balloon into an attractive, illuminated object. Children carrying the balloon will attract the attention of others, especially at night.

[0048] The balloon inflation and air containment device 70 can be provided with a variety of different mounting devices so that the complete, inflated balloon assembly 80 can be mounted in different places. Figures 13a, 13b and 13c show three different ways of mounting the balloon assembly 80. Figure 13a shows a mounting method using a carrying rod 32 that extends through the center of the sealing plug 14 tightly and is secured thereto with or without glue. Figure 13b shows another way to hold the balloon assembly 80 using an alternative sealing plug 15 that connects to a supporting rod 34 on one end, and connects at the other end to a support rod 33 of a lighting source. Figure 13c shows another way to hold the assembly using a different sealing plug 35 that connects to a supporting rod 39 on one end and connects to the filling pipe 10 on the other end.

[0049] While the preferred embodiments of the invention have been described in detail, the invention is not limited to the specific embodiments described above, which should be considered as merely exemplary. Further modifications and extensions of the present invention may be developed, and all such modifications

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are deemed to be within the scope of the present invention as defined by the appended claims.

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